

PATENT SPECIFICATION

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(54) APPARATUS FOR PROCESSING BETTING TICKETS

(71) We, FUJITSU LIMITED and THE JAPAN RACING ASSOCIATION, Companies organized and existing under the laws of Japan of 1015, Kamikodanaka, Nakahara-ku, Kawasaki-shi, Japan and 1-19, Nishishinbashi 1-chome, Minato-ku, Tokyo, Japan do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:-

The present invention relates to an apparatus for processing betting tickets. Said apparatus prints the betting tickets which contain at least one secret code and verifies said betting tickets during payment of dividends.

In gambling, such as at horse races, bicycle races, and auto races, spectators can buy betting tickets while attending such races. Profits can be gained if the numbers on the betting tickets match the winning results of the races. On conventional betting tickets, information recorded on each ticket has been called "Forecast numbers", that is, the frame numbers of the first and second place horses in the race, such as "3-4", and the unit price, such as "1000 Yen", of the betting ticket. As the unit price of said ticket was predetermined, when spectators wished to double or triple their bet on the same betting ticket, they were required to buy a number of the same type of betting ticket. For eliminating the above-mentioned superfluous procedure, variable unit tickets are being used. That is, the price which is recorded on the ticket can be changed. Therefore, one ticket wherein the unit price is recorded as "2000 Yen" corresponds to two tickets wherein the unit price is recorded as "1000 Yen".

However, such conventional betting tickets or unit betting tickets must be bought before every race due to the constantly changing forecast numbers. As an outcome

of this requirement, ticket offices are crowded at all times with spectators who were buying such tickets. Thus, for alleviating congestions and confusions, many more offices had to be provided.

For completely removing the above-mentioned problem of congestion and confusion at the ticket offices, the applicant proposed using a betting ticket on which the spectator could carry multiple bets at the same time. On such a betting ticket, the information concerning, for example, the race numbers, the number of the winning horse W(Win), the placing of the first two horses P (Place) or the forecasting of the race F(Forecast), the betting number, and the number of the unit of the bet are disclosed. By using such a betting ticket, operations at the ticket office could be considerably simplified and the confusion at the ticket windows could be tremendously relieved.

However, as the prices of the above-mentioned unit tickets or multi-betting tickets are quite high in many cases, these tickets are often falsified or forged. When the falsified or forged tickets are used to gain dividends, a large problem of the misuse of tickets is created. For the purpose of removing the above-mentioned problem special printing methods or a special perforation method for inserting the betting information onto the betting tickets is conventionally used. However, such methods cannot completely prevent the falsification or the forgery of tickets.

An object of the present invention is to create a betting ticket processing apparatus which can provide the means for preventing the falsification or the forgery of tickets.

According to the present invention, there is provided an apparatus for processing betting tickets on which betting information and secret code are recorded, wherein said apparatus issues the betting tickets with at least one secret code and checks said secret

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code recorded on said betting ticket when dividends are paid, said apparatus comprising means for forming the secret code in accordance with received betting information, means for recording the or each secret code and the received betting information on betting tickets which are to be issued, and means for checking returned betting tickets on which dividends are to be paid, said checking means comprising means for forming another code in accordance with the recorded received betting information, and means for comparing said secret code with said another code to determine whether or not said dividends are to be paid.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows one example of a betting ticket of a type which may be processed by apparatus according to the invention;

Fig. 2 shows an external view of one example of an apparatus in accordance with the invention for issuing betting tickets;

Fig. 3 shows an operating panel of the apparatus shown in Fig. 2;

Fig. 4 shows an electronic block diagram of the apparatus shown in Fig. 2, and;

Fig. 5 shows an electronic block diagram of circuitry for creating a secret code and for verifying whether the secret code on the ticket is authentic or not.

Referring to section (a) of Fig. 1, a betting ticket 10 is shown which includes the following sample information: the name of the race course "NAKAYAMA"; the date: "76", "3RD PERIOD", "8TH DAY"; the printing machine number "OE33"; the name of the printing office "NAKAYAMA COUNTER"; the race number "11R"; the betting numbers: 4-6, 4-7, 4-8; the betting amounts: "2,000", "3,000", "4,000" Yen; the total sum of 9,000 Yen; visible code number "596" (hereinafter referred to as the secret code) and the ticket number "008554". The betting ticket 10 shown in Fig. 1 relates to the 11th race of the 8th day of the 3rd period; 1976 at the Nakayama Race Course and includes the betting information relating to three betting numbers and of a total of 9,000 Yen. This betting ticket 10 corresponds to 9 pieces of conventional betting tickets. In the betting ticket shown in section (a) of Fig. 1, the betting amount on the ticket is quite small. However, in practice five betting numbers are up to a maximum of 500,000 Yen, can be wagered using one betting ticket. Therefore, utilization of this efficient betting ticket, considerably reduces the risk of confusion at the ticket windows caused by the too frequent purchases of single betting tickets.

Section (b) of Fig. 1 shows a magnetic recording region which is provided on the re-

verse side of the ticket shown in section (a) of Fig. 1. In said magnetic recording region, the same information as that shown in section (a) of Fig. 1 is magnetically recorded. Actually, the information magnetically recorded on the reverse side of the betting ticket is not visible but has nevertheless been shown by dotted lines in Fig. 1.

The reasons for recording the betting information on the reverse side of the betting ticket so as to be readable by mechanical means are explained below.

(1) Since the betting amount recorded on one ticket is variable, it is necessary to calculate the dividends for the ticket, even though the dividends are known with respect to 1000 Yen. This requirement results in an increase of the work load for the clerk in charge.

(2) Since all of the betting information is recorded, it is necessary to refer all betting information on the ticket to the dividends table to determine whether a "win" has occurred and to compute the dividends thereof. These requirements result in an increase of the work load for the clerk in charge.

Therefore, in order to decrease the work load of the clerk, it is necessary to automatically process the above-mentioned requirements. Accordingly, the betting information is recorded on the reverse side of the ticket so as to be able to be read by mechanical means.

The betting ticket is provided as described with magnetic recording regions. The processing apparatus for the betting tickets is provided with a magnetic recording and reading device, and the betting information can be recorded and read visually and/or mechanically.

Referring to Fig. 2, the apparatus for processing the betting ticket of Fig. 1 comprises input devices 1 and 2 through which the operator inputs the betting information and a main body 3. As we will explain hereinafter, the two input devices have the same construction and are connected by cables 6 and 7, respectively, to the common main body 3. The main body is provided with openings 4 and 5 from which betting tickets are issued. These openings are provided for two operators positioned on both sides of the main body 3. The main body 3 is also provided with openings 8 and 9 for inserting the betting tickets on which dividends are to be paid, an operating panel 100 which is provided with rotary switches R₁ through R₄ for setting the semi-fixed information such as "Time", "Name of the race course", "Date", "Year", and with alarm lamps L₁ through L₄ which light when the magnetic read or write system is not operating correctly, when the paper feed is finished, or when a paper jam occurs.

Referring to Fig. 3, the operating panel in the input devices 1 and 2 includes an information inputting panel 1a and a display panel 1b. The display panel includes a race number indicator RD for indicating the race number, a betting information indicator FD, a betting number indicator CD, an amount indicator MD, and a total amount indicator SD for indicating the total amount of the indicator MD. The information inputting panel is composed of a keyboard which includes a group of mode input keys 3a: that is, a betting key 31 operated when the betting ticket is sold, a subtracting key 32 operated when part of the information on the ticket is to be corrected, a repaying key 33 operated when a repayment is carried out; a group of betting keys 3b; that is, three keys 3b which are indicated by letters W(Win), P(Place), and F(Forecast); a group of keys 3c composed of ten keys 0 through 9 for typing the race numbers, the betting numbers and the total amounts, a set key 3d, a transmission key 3e and a race number input key 3f for inputting and changing the race numbers by operating the ten keys 3c.

The operation of the processing apparatus during the period of the printing of betting tickets will now be described with reference to Figs. 3 and 4. When the operator receives betting information from the spectator, he operates a group of keys 3a, 3b, 3c, 3d, 3e and 3f according to said received betting information. For example, when the operator receives the betting information as shown in Fig. 1, he first operates the betting key 31 of the key group 3a so as to set the apparatus to a betting mode. Next, after pushing the race number input key 3f, he pushes the key "1" of the ten-key 3c twice for inputting the race number. Then, he pushes the push button "F" for the key group "3b" and the push buttons "4", "6", "2", "0", "0", "0", in that order. Referring to Fig. 4, this information is successively written in a register RG_i of the input device 11a, and the indications "11", "F", "4-6", "2000 Yen" are then displayed on the display panel 1b of the input device 11a. When the operator has received one item of the betting information, he pushes the set key 3d to send a pause signal. Next, the betting information of "4-7" and of "4000 Yen" are impressed and sent to the register RG_i by operating the ten-key 3c, and displayed on the display panel in a similar manner. When the last item of the betting information has been keyed in, the operator pushes the transmission key 3e for sending the output signal which indicates the end of the betting information to be printed on one betting ticket.

The betting information stored in the register RG_i of the input device 11a is transferred to the register 12 of the main body 3, shown in Fig. 2, for storage therein. The

semi-fixed information such as "Time", "Name of the race course", "Date", and "Year" is supplied from the semi-fixed information source 13 to the register 12. When the transmission key 3e is pushed, the content of the register 12 is sent, under the control of the transmission control device 14, via the interface 18, to the computer CPU 19 and then stored therein. This stored information is used for calculating the dividends of the race. The computer calculates the total amount and sends the information concerning said amount to the terminal side, and the value of said amount is stored in the register 12. The information of said amount is also sent to the register RG_i and is displayed on the display panel SD (shown in Fig. 3). At the same time, two kinds of secret code operators are sent from the computer via the interface 18 and the control device 14 to the secret code adding checking circuits 15a and 15b, respectively. On the other hand, betting information is supplied from the register 12 to the secret code adding checking circuits 15a and 15b. Therefore, said circuits 15a and 15b operate logically according to the secret code operators sent from the computer CPU to form two different kinds of secret codes. One secret code is in a visible form, and said code is formed by a figure code having a predetermined number of digits. The other secret code is in a magnetically readable form, and said code is formed by a bit code having a predetermined number of digits. The former code is the output of the first secret code adding checking circuit 15a. Said output controls a printing device 16 so as to add a secret code in the visible form to the betting ticket. The latter code is the output of the second secret code adding checking circuit 15b, and said output controls the magnetic recorder and reader device 17 for adding a secret code in the magnetically readable form to the betting ticket.

In the printing device 16, the betting information and semi-fixed information from the register 12 are printed on the betting tickets. In addition the secret code in the visible form from the first secret code adding/checking circuit 15a is printed on the betting tickets. Subsequently, the printed betting ticket is sent to the magnetic recorder and reader device 17 where the magnetically readable secret code is added onto the magnetic recording region on the reverse side of the betting ticket, thus the ticket 10a complete with the necessary information is ready for issuing to the spectator.

Next, we will explain the operation for verifying the secret codes during the period of the payment of the dividends. After the race is over and the gained dividends are to be paid, the operator operates the payment key 33 (Fig. 3) on the keyboard 1a and in-

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serts the betting ticket 20 (Fig. 4) to the insertion opening 8 or 9 shown in Fig. 2. When the betting ticket reaches the magnetic recorder and reader device 17 (Fig. 4), said device 17 reads the secret code recorded on the magnetic recording region of the betting ticket and said secret code thus read is supplied to the second secret code adding/checking circuit 15b via register 12. At the same time, the secret code in the visible form (figure) recorded on the surface of the betting ticket is manually inputted by means of the input devices 11a, 11b, and said secret code in the visible form is supplied via the register 12 to the first secret code adding/checking circuit 15a. The betting information read by the magnetic reader 17 and impressed manually is supplied, via the register 12 and the interface 18 to the computer 19. The computer sends back the amount of the dividends to the register 12 and two kinds of secret code operators, corresponding to the input betting information, to the secret code adding/checking circuits 15a, 15b, respectively, via the interface 18 and the control device 14. When said two secret code operators are inputted to the secret code adding/checking circuits 15a, 15b, said circuits 15a and 15b form the secret code on the basis of the betting information which is supplied from the register 12, so that the secret code in the visible form and the secret code in the magnetically readable form are formed therein. Next, said circuits 15a and 15b respectively compare said secret code with the secret code impressed manually and read from the betting ticket, and when the former secret code coincides with the latter secret code, said betting ticket is recognized as an authentic one. Consequently, the amounts of the dividends calculated by the computer 19 are displayed on the input devices 11a and 11b before said amounts are paid to the betting clients.

Fig. 5 shows the circuit 15b in detail. Since circuit 15a has the same construction as that of circuit 15b, we therefore omitted the explanation of said circuit 15a. As shown in Fig. 5, the circuit 15b is composed of a secret code operator register 21 which stores the secret code operator sent from the computer 19 (Fig. 4) a betting information register 22 which stores the betting information received from the magnetic recorder and reader 17 (Fig. 4); a decoder 23 which decodes the content of the secret code operator register 21 and commands one of the operations of addition, subtraction, logical product, etc; an arithmetic circuit 24 which, on command from the decoder 23, forms the secret code by performing one of the above operations with respect to the betting information stored in the betting information register 22; a register 25 which stores the result of said operation; a counter 26 which is

preset to the number of operations to be performed, the content of the counter being reduced by 1 as each operation is performed; a gate circuit 27 which opens so as to pass the result of the operation when the content of the counter becomes "1"; a secret code register 28 which stores the final result of the operations, that is, the secret code, a betting ticket secret code register 29 which stores a secret code magnetically recorded on the betting ticket; and a coincidence circuit 30 which detects whether the contents of the register 28 and the register 29 coincide or not.

First, we will explain the operation of formulating the secret code which is added to the multi-betting ticket before said ticket is sold. The central computer stores a program for determining the secret code operator. For example, the program sums up the total number of items of the betting information received by the computer, divides said sum by three, and selects a secret code operator from the addition operator, the subtraction operator or the logical product operator, in accordance with whether the remainder of the above division is 0, 1 or 2. The above-mentioned addition operator adds all of the betting information on the betting ticket including the race number, the betting number and the total sum. The above subtraction operator successively subtracts portions of the betting information from other portions of the betting information appearing on the betting ticket. The above logical product operator operates the logical product command "and" for all the betting information.

Thus when the betting information is supplied from the input device 11a, 11b to the computer, said computer immediately determines the secret code operator in accordance with this betting information and supplies the secret code operator to the secret code operator register 21. Said secret code operator is decoded by the decoder 23, and when the decoded operator indicates the addition operator, said addition command is supplied to the arithmetic circuit 24.

At the same time as the computer is transferring said addition operator to the secret code operator register 21, said computer sets the number of times the betting information is to be operated on in the counter 26. As the betting information is being supplied to the betting information register 22, the contents of said betting information are added in the arithmetic circuit 24. That is, at first, the first betting information and the second betting information are added together, and the result of said adding operation is stored in the register 25, while at the same time the content of the counter 26 is subtracted by one. Next, the result of said adding operation and the third betting infor-

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mation are added together, while the content of the counter 26 is further subtracted by one. These operations are carried out in the same manner until the content of the counter 26 becomes 1 and the gate signal GS is generated so as to open the gate circuit 27.

Finally, the results of the register 25 and the final betting information are added, and the result of said final adding operation is sent via the gate circuit 27 to be stored in the secret code register 28. At the same time when the content of the counter 26 becomes zero, the operation inhibit signal OI is supplied from the counter 26 to the arithmetic circuit so as to complete the operation of formulating the secret code. As already mentioned, the secret code is supplied via a line 13a to the magnetic recorder and reader 17 and recorded on the magnetic recording region of the betting ticket.

Next, we will explain the operation for verifying the secret code during repayment on the betting ticket.

After the operation of the repayment key 33 shown in Fig. 3, the operator inserts the multi-betting ticket into the ticket insertion opening 8 or 9 as shown in Fig. 2. After the betting ticket has been inserted, the magnetic recorder and reader 17 of the betting ticket processor reads the betting information and the secret code recorded on the reverse side of said betting ticket. Subsequently, the betting information is stored in the betting information register 22, and the secret code is stored in the betting ticket secret code register 29.

At the same time, all of the betting information is sent to the computer. Hereinafter, according to a similar process as followed during the printing of the betting ticket, the secret code is first derived from the betting information read by the magnetic recorder and reader 17 and then said secret code is stored in the secret code register 28. The coincidence circuit 30 compares the code stored in the betting ticket secret code register 29 and that stored in the secret code register 28. When said two codes coincide, then said coincidence circuit 30 sends, via the line 14a, a coincident signal to the control circuit 14 to indicate that the betting ticket is authentic.

As mentioned above, two secret codes are added to the betting ticket. One code is in visible form and the other code is in a form which can be read by a machine. When the dividend of the race is repaid to the spectator after the race, these secret codes are checked, to prevent falsification of the betting ticket.

The above-mentioned severe check is required for the betting ticket, such as the unit ticket or the multi-betting ticket, which carries a very high bet. However, with respect to a betting ticket which carries a small bet,

it is possible to check said betting ticket by using only one of the two secret codes, either the visible secret code or the mechanically readable secret code. It is also possible to construct the logic circuit so that both secret codes are checked with respect to the high cost betting ticket, and only one secret code is checked with respect to the low cost betting ticket.

In the above embodiment the check circuits 15a and 15b are provided for adding and checking the secret codes. However, the function of these adding/checking circuits 15a and 15b can be carried out by the computer. In this case, the computer stores the program for adding the secret code and the program for checking the secret code in advance. Such programs easily verify and add the necessary secret codes during when betting tickets are sold or when dividends are paid on winning betting tickets.

WHAT WE CLAIM IS:-

1. An apparatus for processing betting tickets on which betting information and secret code are recorded, wherein said apparatus issues the betting tickets with at least one secret code and checks said secret code recorded on said betting ticket when dividends are paid, said apparatus comprising means for forming the secret code in accordance with received betting information, means for recording the or each secret code and the received betting information on betting tickets which are to be issued, and means for checking returned betting tickets on which dividends are to be paid, said checking means comprising means for forming another code in accordance with the recorded received betting information, and means for comparing said secret code with said another code to determine whether or not said dividends are to be paid.

2. An apparatus for processing betting tickets according to Claim 1, wherein said recording means comprises means for printing said secret code in a visually readable form on said betting tickets and means for simultaneously recording said secret code in a machine-readable form on said betting tickets, and wherein said comparing means comprises means for comparing said visible secret code and said machine-readable secret code with said another code.

3. An apparatus according to Claim 1, wherein the secret code forming means comprise means for forming first and second secret codes which are different from each other but are both based on the recorded and received betting information, the recording means comprise means for recording said first secret code in a visually readable form on said tickets, means for recording said second secret code on the tickets in a machine-readable form, and the checking means comprise means for forming two

other codes in accordance with the recorded/received betting information and means for comparing said first and second secret codes with said two other codes.

- 5 4. An apparatus for processing betting tickets substantially as hereinbefore described with reference to the accompanying

drawings.

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COMPLETE SPECIFICATION

5 SHEETS

This drawing is a reproduction of
the Original on a reduced scale

Sheet 1

Fig. 1

(a)

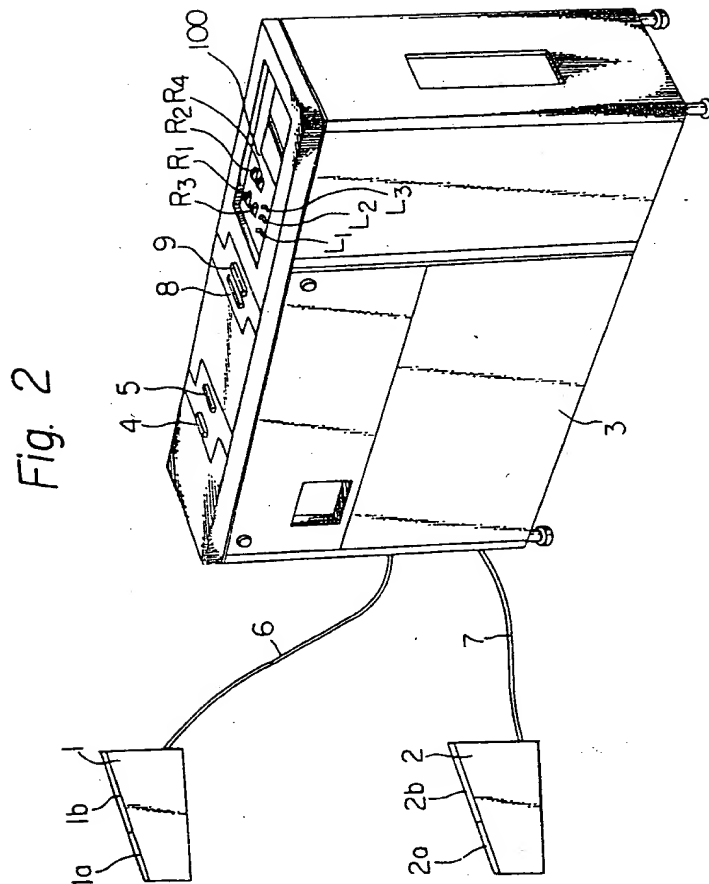
1a

NAKA-	OE	11R	46	***	2000	YEN
YAMA	33		47	***	3000	YEN
'76			48	***	4000	YEN
3rd	NAKAYAMA COUNTER			*****		YEN
PERIOD				*****		YEN
8th DAY		TOTAL	***	9000	YEN	
				596008554	*	

(b)

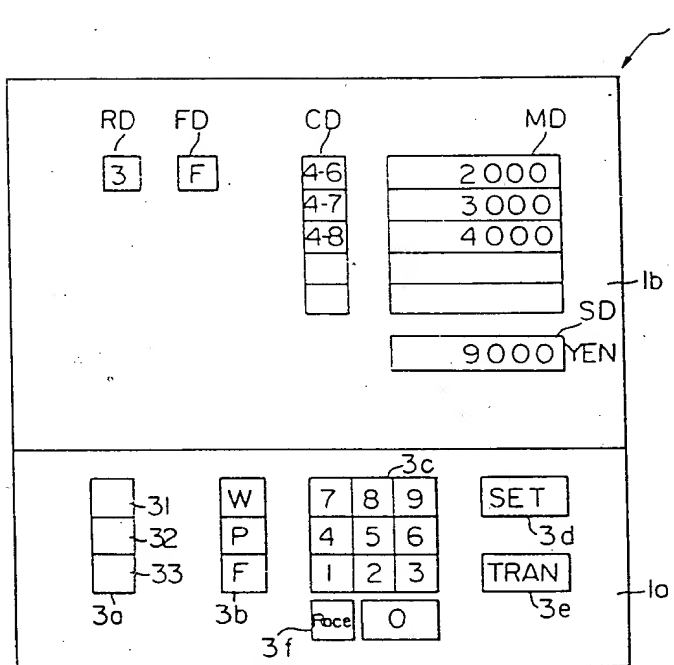
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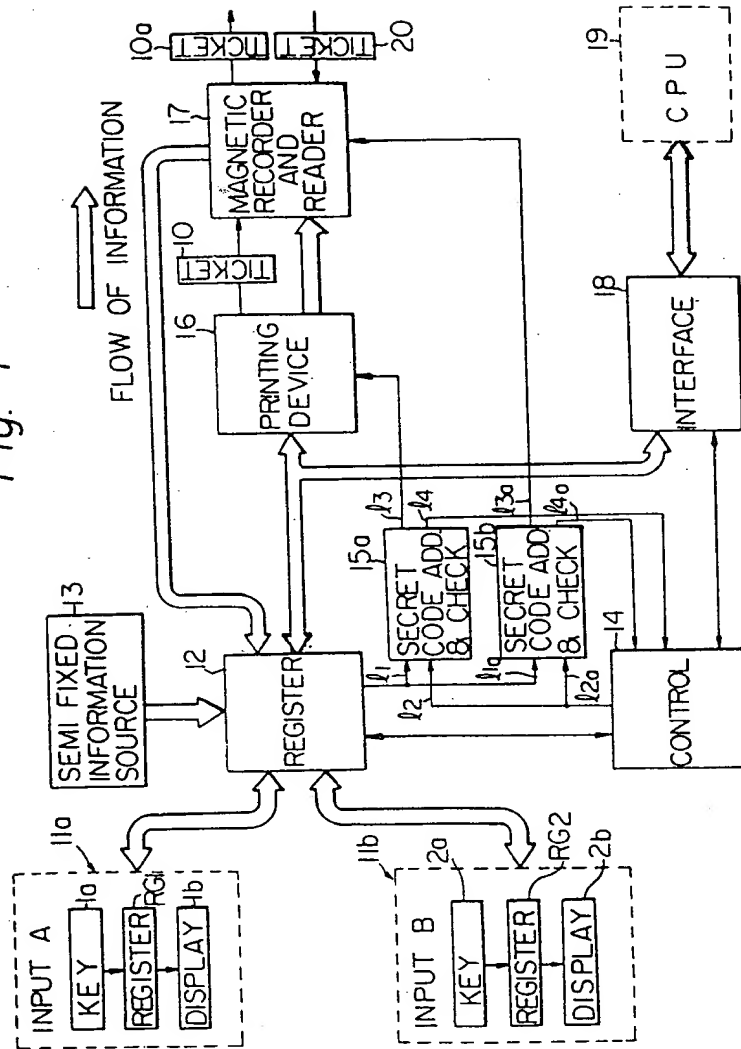
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Fig. 3

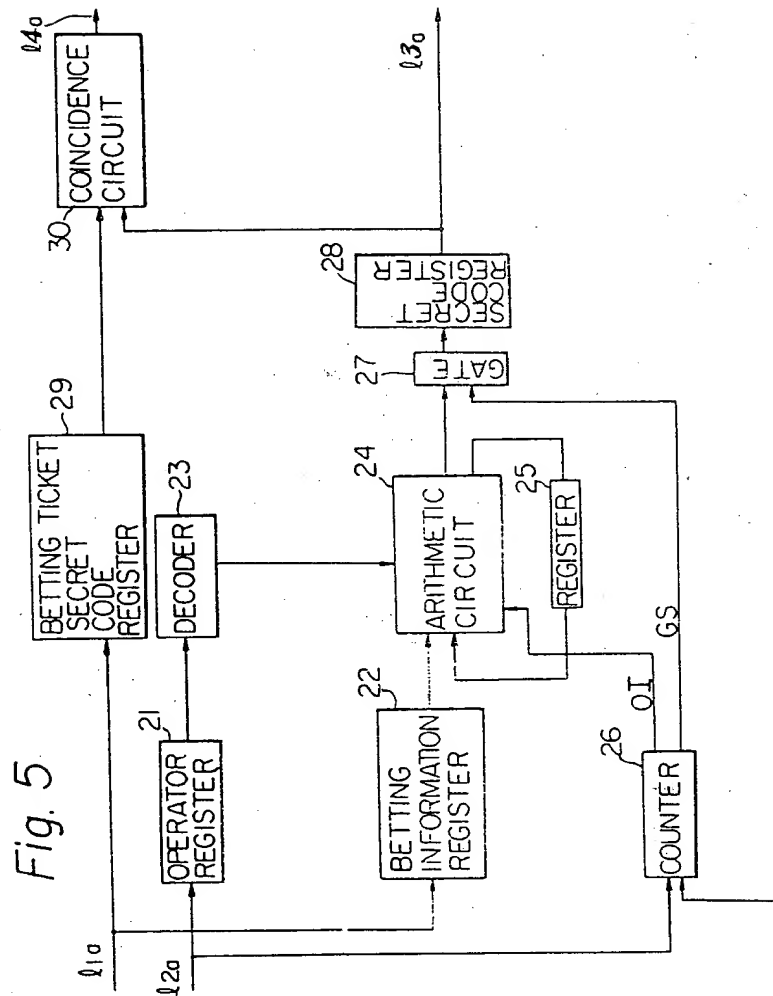


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Fig. 4



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